

## SEQUENCE LISTING

<110> Yagi, Yoshihiko  
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Poorman, Roger A.  
Epps, Dennis E.

<120> A Continuous-Read Assay for the Detection of De Novo HCV RNA Polymerase Activity

<130> 02-333-A

<160> 7

<170> PatentIn version 3.1

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<212> DNA  
<213> Hepatitis C virus

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Pro Cys Ala Ala Glu Glu Ser Lys Leu Pro Ile Asn Ala Leu Ser Asn  
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35 40 45

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Ala Ser Leu Arg Gln Lys Lys Val Thr Phe Asp Arg Leu Gln Val Leu  
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Asp Asp His Tyr Arg Asp Val Leu Lys Glu Met Lys Ala Lys Ala Ser  
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Pro Pro His Ser Ala Lys Ser Lys Phe Gly Tyr Gly Ala Lys Asp Val  
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Arg Ser Leu Ser Ser Arg Ala Val Asn His Ile Arg Ser Val Trp Lys	
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gac tt <sup>g</sup> ct <sup>g</sup> gag g <sup>a</sup> c act g <sup>a</sup> c a <sup>c</sup> a c <sup>c</sup> a att c <sup>a</sup> g acc acc at <sup>c</sup> at <sup>g</sup> g <sup>c</sup> a	432
Asp Leu Leu Glu Asp Thr Asp Thr Pro Ile Gln Thr Thr Ile Met Ala	
130 135 140	
aaa a <sup>a</sup> t gag g <sup>t</sup> t t <sup>t</sup> c t <sup>g</sup> c g <sup>t</sup> c c <sup>a</sup> a c <sup>c</sup> a gag aaa g <sup>g</sup> g a <sup>g</sup> g c <sup>g</sup> c a <sup>a</sup> a c <sup>c</sup> a	480
Lys Asn Glu Val Phe Cys Val Gln Pro Glu Lys Gly Gly Arg Lys Pro	
145 150 155 160	
gct c <sup>g</sup> c <sup>t</sup> c at <sup>c</sup> g <sup>t</sup> a t <sup>t</sup> c c <sup>c</sup> a g <sup>a</sup> c ct <sup>g</sup> g <sup>g</sup> g g <sup>t</sup> t c <sup>g</sup> t g <sup>t</sup> a t <sup>g</sup> c g <sup>a</sup> g a <sup>a</sup> g	528
Ala Arg Leu Ile Val Phe Pro Asp Leu Gly Val Arg Val Cys Glu Lys	
165 170 175	
at <sup>g</sup> g <sup>c</sup> c c <sup>t</sup> t tac g <sup>a</sup> c g <sup>t</sup> g g <sup>t</sup> t t <sup>c</sup> c act c <sup>t</sup> t c <sup>c</sup> t c <sup>a</sup> g g <sup>c</sup> c g <sup>t</sup> g at <sup>g</sup> g <sup>g</sup> c	576
Met Ala Leu Tyr Asp Val Val Ser Thr Leu Pro Gln Ala Val Met Gly	
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t <sup>c</sup> c t <sup>c</sup> a tac g <sup>g</sup> g a <sup>t</sup> t c <sup>a</sup> a t <sup>c</sup> t c <sup>c</sup> t a <sup>a</sup> g c <sup>a</sup> g c <sup>g</sup> g g <sup>t</sup> c g <sup>a</sup> g t <sup>t</sup> c ct <sup>g</sup>	624
Ser Ser Tyr Gly Phe Gln Tyr Ser Pro Lys Gln Arg Val Glu Phe Leu	
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g <sup>t</sup> g a <sup>a</sup> t acc t <sup>g</sup> g a <sup>a</sup> a g <sup>c</sup> a a <sup>a</sup> g a <sup>a</sup> a t <sup>g</sup> c c <sup>c</sup> t at <sup>g</sup> g <sup>g</sup> c t <sup>t</sup> c t <sup>c</sup> a t <sup>a</sup> t g <sup>a</sup> c	672
Val Asn Thr Trp Lys Ala Lys Cys Pro Met Gly Phe Ser Tyr Asp	
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acc c <sup>g</sup> g c <sup>t</sup> t t <sup>t</sup> t g <sup>a</sup> c t <sup>c</sup> a ac <sup>g</sup> g <sup>t</sup> c act g <sup>a</sup> g a <sup>a</sup> t g <sup>a</sup> c at <sup>c</sup> c <sup>g</sup> t g <sup>t</sup> t g <sup>a</sup> g	720
Thr Arg Cys Phe Asp Ser Thr Val Thr Glu Asn Asp Ile Arg Val Glu	
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g <sup>a</sup> g t <sup>c</sup> a att tac c <sup>a</sup> a t <sup>t</sup> g t <sup>t</sup> g g <sup>a</sup> c t <sup>t</sup> g g <sup>c</sup> c c <sup>c</sup> c g <sup>a</sup> a g <sup>c</sup> t a <sup>g</sup> a c <sup>a</sup> g g <sup>c</sup> c	768
Glu Ser Ile Tyr Gln Cys Cys Asp Leu Ala Pro Glu Ala Arg Gln Ala	
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ata agg tc <sup>g</sup> c <sup>t</sup> c a <sup>c</sup> a g <sup>g</sup> g c <sup>t</sup> c t <sup>a</sup> t g <sup>t</sup> c g <sup>g</sup> g g <sup>g</sup> t c <sup>c</sup> c at <sup>g</sup> act a <sup>a</sup> c	816
Ile Arg Ser Leu Thr Glu Arg Leu Tyr Val Gly Gly Pro Met Thr Asn	
260 265 270	
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Ser Lys Gly Gln Asn Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val	
275 280 285	
ct <sup>g</sup> ac <sup>g</sup> ac <sup>t</sup> ag <sup>c</sup> t <sup>g</sup> c g <sup>g</sup> t a <sup>a</sup> t acc c <sup>t</sup> c a <sup>c</sup> a t <sup>g</sup> c tac tt <sup>g</sup> a <sup>a</sup> g g <sup>c</sup> c g <sup>c</sup> t	912
Leu Thr Thr Ser Cys Gly Asn Thr Leu Thr Cys Tyr Leu Lys Ala Ala	
290 295 300	
g <sup>c</sup> a g <sup>c</sup> c t <sup>t</sup> g c <sup>g</sup> a g <sup>c</sup> t g <sup>c</sup> c a <sup>a</sup> g c <sup>t</sup> c c <sup>a</sup> g g <sup>a</sup> c t <sup>g</sup> c ac <sup>g</sup> at <sup>g</sup> c <sup>t</sup> c g <sup>t</sup> g a <sup>a</sup> t	960
Ala Ala Cys Arg Ala Ala Lys Leu Gln Asp Cys Thr Met Leu Val Asn	
305 310 315 320	
g <sup>g</sup> a g <sup>a</sup> c g <sup>a</sup> c c <sup>t</sup> t g <sup>t</sup> c g <sup>t</sup> t at <sup>c</sup> t <sup>t</sup> g g <sup>a</sup> a ag <sup>c</sup> g <sup>c</sup> g g <sup>g</sup> g acc c <sup>a</sup> a g <sup>a</sup> g g <sup>a</sup> c	1008
Gly Asp Asp Leu Val Val Ile Cys Glu Ser Ala Gly Thr Gln Glu Asp	
325 330 335	
g <sup>c</sup> g g <sup>c</sup> a ag <sup>c</sup> c <sup>t</sup> a c <sup>g</sup> a g <sup>t</sup> c t <sup>t</sup> c ac <sup>g</sup> gag g <sup>c</sup> t at <sup>g</sup> act agg tac t <sup>c</sup> t g <sup>c</sup> c	1056

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Pro Pro Gly Asp Pro Pro Gln Pro Glu Tyr Asp Leu Glu Leu Ile Thr			
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Val Tyr Tyr Leu Thr Arg Asp Pro Thr Val Pro Leu Ala Arg Ala Ala			
385	390	395	400
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Trp Glu Thr Ala Arg His Thr Pro Val Asn Ser Trp Leu Gly Asn Ile			
405	410	415	
atc atg tat gcg ccc act ttg tgg gca agg atg att ctg atg act cac			1296
Ile Met Tyr Ala Pro Thr Leu Trp Ala Arg Met Ile Leu Met Thr His			
420	425	430	
ttc ttc tcc atc ctt cta gcc cag gag caa ctt gaa aaa gcc ctg gat			1344
Phe Phe Ser Ile Leu Leu Ala Gln Glu Gln Leu Glu Lys Ala Leu Asp			
435	440	445	
tgt cag atc tac ggg gct tgt tac tcc att gag cca ctt gac cta cct			1392
Cys Gln Ile Tyr Gly Ala Cys Tyr Ser Ile Glu Pro Leu Asp Leu Pro			
450	455	460	
cag atc att gaa cga ctc cat ggt ctt agc gca ttt tca ctc cat agt			1440
Gln Ile Ile Glu Arg Leu His Gly Leu Ser Ala Phe Ser Leu His Ser			
465	470	475	480
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Tyr Ser Pro Gly Glu Ile Asn Arg Val Ala Ser Cys Leu Arg Lys Leu			
485	490	495	
ggg gta cca ccc ttg cga gtc tgg aga cat cgg gcc aga agt gtc cgc			1536
Gly Val Pro Pro Leu Arg Val Trp Arg His Arg Ala Arg Ser Val Arg			
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Ala Lys Leu Leu Ser Gln Gly Gly Arg Ala Ala Ile Cys Gly Lys Tyr			
515	520	525	
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Leu Phe Asn Trp Ala Val Arg Thr Lys Leu Lys Leu Thr Pro Ile Pro			
530	535	540	
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Ala Ala Ser Arg Leu Asp Leu Ser Gly Trp Phe Val Ala Gly Tyr Ser			
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ggg gga gac ata tat cac agc ctg tct cgt gcc cga ccc cgc tgg ttc			1728
Gly Gly Asp Ile Tyr His Ser Leu Ser Arg Ala Arg Pro Arg Trp Phe			

565

570

575

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ccc aac cgg cat cac cat cac cat cac 1803  
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35 40 45

Ala Ser Leu Arg Gln Lys Lys Val Thr Phe Asp Arg Leu Gln Val Leu  
50 55 60

Asp Asp His Tyr Arg Asp Val Leu Lys Glu Met Lys Ala Lys Ala Ser  
65 70 75 80

Thr Val Lys Ala Lys Leu Leu Ser Val Glu Glu Ala Cys Lys Leu Thr  
85 90 95

Pro Pro His Ser Ala Lys Ser Lys Phe Gly Tyr Gly Ala Lys Asp Val  
100 105 110

Arg Ser Leu Ser Ser Arg Ala Val Asn His Ile Arg Ser Val Trp Lys  
115 120 125

Asp Leu Leu Glu Asp Thr Asp Thr Pro Ile Gln Thr Thr Ile Met Ala  
130 135 140

Lys Asn Glu Val Phe Cys Val Gln Pro Glu Lys Gly Gly Arg Lys Pro  
145 150 155 160

Ala Arg Leu Ile Val Phe Pro Asp Leu Gly Val Arg Val Cys Glu Lys  
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Met Ala Leu Tyr Asp Val Val Ser Thr Leu Pro Gln Ala Val Met Gly  
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195 200 205

Val Asn Thr Trp Lys Ala Lys Lys Cys Pro Met Gly Phe Ser Tyr Asp  
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Thr Arg Cys Phe Asp Ser Thr Val Thr Glu Asn Asp Ile Arg Val Glu  
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Glu Ser Ile Tyr Gln Cys Cys Asp Leu Ala Pro Glu Ala Arg Gln Ala  
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Ile Arg Ser Leu Thr Glu Arg Leu Tyr Val Gly Gly Pro Met Thr Asn  
260 265 270

Ser Lys Gly Gln Asn Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val  
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Ala Ala Cys Arg Ala Ala Lys Leu Gln Asp Cys Thr Met Leu Val Asn  
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Pro Pro Gly Asp Pro Pro Gln Pro Glu Tyr Asp Leu Glu Leu Ile Thr  
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Ser Cys Ser Ser Asn Val Ser Val Ala His Asp Ala Ser Gly Lys Arg  
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Val Tyr Tyr Leu Thr Arg Asp Pro Thr Val Pro Leu Ala Arg Ala Ala  
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Ile Met Tyr Ala Pro Thr Leu Trp Ala Arg Met Ile Leu Met Thr His  
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Phe Phe Ser Ile Leu Leu Ala Gln Glu Gln Leu Glu Lys Ala Leu Asp  
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Cys Gln Ile Tyr Gly Ala Cys Tyr Ser Ile Glu Pro Leu Asp Leu Pro  
450 455 460

Gln Ile Ile Glu Arg Leu His Gly Leu Ser Ala Phe Ser Leu His Ser  
465 470 475 480

Tyr Ser Pro Gly Glu Ile Asn Arg Val Ala Ser Cys Leu Arg Lys Leu  
485 490 495

Gly Val Pro Pro Leu Arg Val Trp Arg His Arg Ala Arg Ser Val Arg  
500 505 510

Ala Lys Leu Leu Ser Gln Gly Gly Arg Ala Ala Ile Cys Gly Lys Tyr  
515 520 525

Leu Phe Asn Trp Ala Val Arg Thr Lys Leu Lys Leu Thr Pro Ile Pro  
530 535 540

Ala Ala Ser Arg Leu Asp Leu Ser Gly Trp Phe Val Ala Gly Tyr Ser  
545 550 555 560

Gly Gly Asp Ile Tyr His Ser Leu Ser Arg Ala Arg Pro Arg Trp Phe  
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Pro Asn Arg His His His His His  
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 ccg tgc gct gcg gag gaa agc aag ctg ccc atc aac gcg ctg agc aac 96  
 Pro Cys Ala Ala Glu Glu Ser Lys Leu Pro Ile Asn Ala Leu Ser Asn  
 20 25 30  
  
 tcc ttg ctg cgt cac cat aac ctg gtc tat tcc aca aca tcc cgc agt 144  
 Ser Leu Leu Arg His His Asn Leu Val Tyr Ser Thr Thr Ser Arg Ser  
 35 40 45  
  
 gca agc ctg cgg cag aag gtc acc ttt gac aga ctg caa gtc ctg 192  
 Ala Ser Leu Arg Gln Lys Lys Val Thr Phe Asp Arg Leu Gln Val Leu  
 50 55 60  
  
 gac gat cat tac cgg gac gtg ctc aag gag atg aag gcg aag gcg tcc 240  
 Asp Asp His Tyr Arg Asp Val Leu Lys Glu Met Lys Ala Lys Ala Ser  
 65 70 75 80  
  
 aca gtg aag gct aaa ctg cta tct gta gaa gaa gca tgc aag ctg acg 288  
 Thr Val Lys Ala Lys Leu Leu Ser Val Glu Glu Ala Cys Lys Leu Thr  
 85 90 95  
  
 ccc ccg cat tcg gcc aaa tcc aaa ttt ggc tat ggg gca aag gac gtc 336  
 Pro Pro His Ser Ala Lys Ser Lys Phe Gly Tyr Gly Ala Lys Asp Val  
 100 105 110  
  
 cgg agc cta tcc agc agg gcc gtt aac cac atc cgc tcc gtg tgg aag 384  
 Arg Ser Leu Ser Arg Ala Val Asn His Ile Arg Ser Val Trp Lys  
 115 120 125  
  
 gac ttg ctg gag gac act gac aca cca att cag acc acc atc atg gca 432  
 Asp Leu Leu Glu Asp Thr Asp Thr Pro Ile Gln Thr Ile Met Ala  
 130 135 140  
  
 aaa aat gag gtt ttc tgc gtc caa cca gag aaa gga ggc cgc aaa cca 480  
 Lys Asn Glu Val Phe Cys Val Gln Pro Glu Lys Gly Arg Lys Pro  
 145 150 155 160  
  
 gct cgc ctc atc gta ttc cca gac ctg gga gtt cgt gta tgc gag aag 528  
 Ala Arg Leu Ile Val Phe Pro Asp Leu Gly Val Arg Val Cys Glu Lys  
 165 170 175

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acc cgc tgt ttt gac tca acg gtc act gag aat gac atc cgt gtt gag Thr Arg Cys Phe Asp Ser Thr Val Thr Glu Asn Asp Ile Arg Val Glu 225 230 235 240	720
gag tca att tac caa tgt tgt gac ttg gcc ccc gaa gct aga cag gcc Glu Ser Ile Tyr Gln Cys Cys Asp Leu Ala Pro Glu Ala Arg Gln Ala 245 250 255	768
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tcc aaa ggg cag aac tgc ggc tat cgc cgg tgc cgc gcg agc ggc gtg Ser Lys Gly Gln Asn Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val 275 280 285	864
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Trp Glu Thr Ala Arg His Thr Pro Val Asn Ser Trp Leu Gly Asn Ile			
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Ile Met Tyr Ala Pro Thr Leu Trp Ala Arg Met Ile Leu Met Thr His			
420	425	430	
ttc ttc tcc atc ctt cta gcc cag gag caa ctt gaa aaa gcc ctg gat			1344
Phe Phe Ser Ile Leu Leu Ala Gln Glu Gln Leu Glu Lys Ala Leu Asp			
435	440	445	
tgt cag atc tac ggg gct tgt tac tcc att gag cca ctt gac cta cct			1392
Cys Gln Ile Tyr Gly Ala Cys Tyr Ser Ile Glu Pro Leu Asp Leu Pro			
450	455	460	
cag atc att gaa cga ctc cat ggt ctt agc gca ttt tca ctc cat agt			1440
Gln Ile Ile Glu Arg Leu His Gly Leu Ser Ala Phe Ser Leu His Ser			
465	470	475	480
tac tct cca ggt gag atc aat agg gtg gct tca tgc ctc agg aag ctt			1488
Tyr Ser Pro Gly Glu Ile Asn Arg Val Ala Ser Cys Leu Arg Lys Leu			
485	490	495	
ggg gta cca ccc ttg cga gtc tgg aga cat cgg gcc aga agt gtc cgc			1536
Gly Val Pro Pro Leu Arg Val Trp Arg His Arg Ala Arg Ser Val Arg			
500	505	510	
gct aag tta ctg tcc cag ggg ggg agg gcc gcc att tgt ggc aag tac			1584
Ala Lys Leu Leu Ser Gln Gly Arg Ala Ala Ile Cys Gly Lys Tyr			
515	520	525	
ctc ttc aac tgg gca gta agg acc aag ctt aaa ctc act cca att ccg			1632
Leu Phe Asn Trp Ala Val Arg Thr Lys Leu Lys Leu Thr Pro Ile Pro			
530	535	540	
gct gcg tcc cgg ctg gac ttg tcc ggc tgg ttc gtt gct ggc tac agc			1680
Ala Ala Ser Arg Leu Asp Leu Ser Gly Trp Phe Val Ala Gly Tyr Ser			
545	550	555	560
ggg gga gac ata tat cac agc ctg tct cgt gcc cga ccc cgc cat cac			1728
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His His His His			
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35 40 45

Ala Ser Leu Arg Gln Lys Lys Val Thr Phe Asp Arg Leu Gln Val Leu  
50 55 60

Asp Asp His Tyr Arg Asp Val Leu Lys Glu Met Lys Ala Lys Ala Ser  
65 70 75 80

Thr Val Lys Ala Lys Leu Leu Ser Val Glu Glu Ala Cys Lys Leu Thr  
85 90 95

Pro Pro His Ser Ala Lys Ser Lys Phe Gly Tyr Gly Ala Lys Asp Val  
100 105 110

Arg Ser Leu Ser Ser Arg Ala Val Asn His Ile Arg Ser Val Trp Lys  
115 120 125

Asp Leu Leu Glu Asp Thr Asp Thr Pro Ile Gln Thr Thr Ile Met Ala  
130 135 140

Lys Asn Glu Val Phe Cys Val Gln Pro Glu Lys Gly Arg Lys Pro  
145 150 155 160

Ala Arg Leu Ile Val Phe Pro Asp Leu Gly Val Arg Val Cys Glu Lys  
165 170 175

Met Ala Leu Tyr Asp Val Val Ser Thr Leu Pro Gln Ala Val Met Gly  
180 185 190

Ser Ser Tyr Gly Phe Gln Tyr Ser Pro Lys Gln Arg Val Glu Phe Leu  
195 200 205

Val Asn Thr Trp Lys Ala Lys Lys Cys Pro Met Gly Phe Ser Tyr Asp  
210 215 220

Thr Arg Cys Phe Asp Ser Thr Val Thr Glu Asn Asp Ile Arg Val Glu  
225 230 235 240

Glu Ser Ile Tyr Gln Cys Cys Asp Leu Ala Pro Glu Ala Arg Gln Ala  
245 250 255

Ile Arg Ser Leu Thr Glu Arg Leu Tyr Val Gly Gly Pro Met Thr Asn  
260 265 270

Ser Lys Gly Gln Asn Cys Gly Tyr Arg Arg Cys Arg Ala Ser Gly Val  
275 280 285

Leu Thr Thr Ser Cys Gly Asn Thr Leu Thr Cys Tyr Leu Lys Ala Ala  
290 295 300

Ala Ala Cys Arg Ala Ala Lys Leu Gln Asp Cys Thr Met Leu Val Asn  
305 310 315 320

Gly Asp Asp Leu Val Val Ile Cys Glu Ser Ala Gly Thr Gln Glu Asp  
325 330 335

Ala Ala Ser Leu Arg Val Phe Thr Glu Ala Met Thr Arg Tyr Ser Ala  
340 345 350

Pro Pro Gly Asp Pro Pro Gln Pro Glu Tyr Asp Leu Glu Leu Ile Thr  
355 360 365

Ser Cys Ser Ser Asn Val Ser Val Ala His Asp Ala Ser Gly Lys Arg  
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Val Tyr Tyr Leu Thr Arg Asp Pro Thr Val Pro Leu Ala Arg Ala Ala  
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Trp Glu Thr Ala Arg His Thr Pro Val Asn Ser Trp Leu Gly Asn Ile  
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Ile Met Tyr Ala Pro Thr Leu Trp Ala Arg Met Ile Leu Met Thr His  
420 425 430

Phe Phe Ser Ile Leu Leu Ala Gln Glu Gln Leu Glu Lys Ala Leu Asp  
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Cys Gln Ile Tyr Gly Ala Cys Tyr Ser Ile Glu Pro Leu Asp Leu Pro

450

455

460

Gln Ile Ile Glu Arg Leu His Gly Leu Ser Ala Phe Ser Leu His Ser  
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Tyr Ser Pro Gly Glu Ile Asn Arg Val Ala Ser Cys Leu Arg Lys Leu  
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Gly Val Pro Pro Leu Arg Val Trp Arg His Arg Ala Arg Ser Val Arg  
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Ala Lys Leu Leu Ser Gln Gly Gly Arg Ala Ala Ile Cys Gly Lys Tyr  
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Leu Phe Asn Trp Ala Val Arg Thr Lys Leu Lys Leu Thr Pro Ile Pro  
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Ala Ala Ser Arg Leu Asp Leu Ser Gly Trp Phe Val Ala Gly Tyr Ser  
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His His His His  
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